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HOUSE OF REPRESENTATIVES

REPORT
101-320

AVIATION RESEARCH GRANT ACT OF 1989

OCTOBER 30, 1989.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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Mr. ROE, from the Committee on Science, Space, and Technology, submitted the following

REPORT

[To accompany H.R. 2581]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 2581) to authorize the Federal Aviation Administration to establish an aviation research grant program, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Aviation Research Grant Act of 1989".

SEC. 2. FINDINGS AND PURPOSE.

(a) FINDINGS.—Congress makes the following findings:

(1) The Federal Aviation Administration lacks legislative authority to award research grants to colleges, universities, and nonprofit research organizations.

(2) The current procurement mechanisms for contracting with college, university, and nonprofit research organizations are cumbersome, "milestone" oriented, inflexible, and not cost-effective for either the Federal Aviation Administration or the research organizations.

(3) Many colleges, universities, and nonprofit research organizations have personnel and facilities already engaged in research in areas which are of interest to the Federal Aviation Administration.

(4) There are areas of research of special interest to the Federal Aviation Administration (such as research on air traffic control automation, aging aircraft and structural integrity, aviation training, human performance, aircraft noise abatement, and aviation applications of artificial intelligence), appropriate for academic research, which are not currently being adequately explored at colleges, universities, and nonprofit research organizations.

(5) There is a limited pool from which the Federal Aviation Administration and other segments of the aviation community can acquire the trained personnel and degree of expertise needed to conduct and manage projects in the many specialized areas of aviation-related research.

(b) PURPOSES.—The purposes of this Act are as follows:

(1) To enhance the Federal Government's access to university research capabilities and products by granting the Federal Aviation Administration the authority to award single and multiyear research grants to colleges, universities, and nonprofit research organizations.

(2) To authorize the establishment of "Centers of Excellence" for research into aviation-related areas of unique interest to the Federal Aviation Administration which are not adequately sponsored by the aviation industry.

(3) To create a pool of technical professionals trained in aviation-related research areas of unique interest to the Federal Aviation Administration and the aviation community.

SEC. 3. AVIATION RESEARCH GRANT PROGRAM.

(a) IN GENERAL.—Section 312 of the Federal Aviation Act of 1958 (49 U.S.C. App. 1353) is amended by adding at the end thereof the following new subsection:

"(g) RESEARCH GRANT PROGRAM.—

"(1) GENERAL AUTHORITY.—The Administrator may make grants to colleges, universities, and non-profit research organizations (A) to conduct aviation research, and (B) to establish centers of excellence for continuing research into areas deemed by the Administrator to be required for the long-term growth of civil aviation. Such research may include, but is not restricted to, research in the following areas among others; air traffic control automation, aviation applications of artificial intelligence, aviation and air traffic control training technologies and techniques, human factors (including those in highly automated environments) airspace and airport planning and design, airport capacity enhancement techniques, and aviation safety.

"(2) APPLICATIONS.—A university, college, or nonprofit organization interested in receiving a grant under this subsection may submit to the Administrator an application for such grant. Such application shall be in such form and contain such information as the Administrator may require.

"(3) SELECTION.—The Administrator shall establish a solicitation, review, and evaluation process that ensures (A) the funding under this subsection of proposals having adequate merit and relevancy to the mission of the Federal Aviation Administration, (B) an equitable geographical distribution of grant funds under this subsection, and (C) the inclusion of historically black colleges and universities and other minority institutions for funding consideration under this subsection.

"(4) RECORDS.—Each person awarded a grant under this subsection shall maintain such records as the Administrator may require as being necessary to facilitate an effective audit and evaluation of the use of grant funds.

"(5) REPORTS.—The Administrator shall make an annual report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on the research grant program conducted under this subsection.".

"(b) CONFORMING AMENDMENT.—That portion of the table of contents contained in the first section of such Act which appears under the heading:

"Sec. 312. Development planning."

is amended by adding at the end the following:

"(g) Research grant program.".

"(c) FUNDING.—Section 506(b)(2) of the Airport and Airway Improvement Act of 1982 (49 U.S.C. App. 2205(b)(2)) is amended by adding at the end thereof the following new sentence: "Not less than 1 percent of the funds made available under this paragraph for a fiscal year shall be available to the Administrator for making grants under section 312(g) of the Federal Aviation Act of 1958.".

I. SUMMARY OF COMMITTEE ACTIONS

The Science, Space, and Technology Committee's Subcommittee on Transportation, Aviation, and Materials conducted two hearings during which Federal Aviation Administration (FAA) witnesses commented on that agency's lack of a legislated authority to award research grants to colleges and universities and how that lack of grant authority hindered their ability to quickly access the research capabilities and innovations available at those institutions. The two hearings were on (1) Airport Security (Feb. 9, 1989) and (2) Oversight of the FAA Research, Engineering, and Development (RE&D) Budget (April 11, 12, 1989).

In response, the Chairman of the Subcommittee, Mr. Valentine of N.C., along with seven cosponsors, introduced H.R. 2581, the Aviation Research Grant Act of 1989, to provide the FAA with the authority to award research grants to colleges, universities, and non-profit organizations. H.R. 2581 was introduced on June 7, 1989 and was referred solely to the Committee on Science, Space, and Technology, which in turn referred it to the Subcommittee on Transportation, Aviation, and Materials. The Subcommittee provided copies of the bill to 12 academic institutions and solicited their comments. The comments of those who responded were translated into three of the amendments offered by the Chairman at the Subcommittee mark-up. There were no negative comments.

The Subcommittee markup was held on October 4, 1989. A total of five amendments were offered and adopted. Two of the amendments were clarifying adjustments to emphasize that an FAA research grant program must be flexible enough and broad enough to be responsive to the research needs of the agency. Another clarifying amendment made clear that the area of human factors research was all inclusive and that the human factors associated with highly automated environments was only one of its component elements. The process for awarding research grants was addressed in an amendment that stipulated that the evaluation of grant proposals must consider merit and relevancy, equitable geographical distribution, and the inclusion of historically black and other minority institutions for funding consideration. The fifth amendment raised the amount of funds available for the grant program from .75% to 1% of the Research, Engineering, and Development monies available to FAA each fiscal year. A motion to report the bill, as amended, to the Full Committee was approved by unanimous voice vote.

On October 19, 1989, the Committee on Science, Space, and Technology met to markup the bill. Two amendments were adopted which added the terms "aging aircraft", "structural integrity", and "aircraft noise abatement" to the list of FAA research interests. The Committee ordered the bill reported with an amendment in the nature of a substitute by unanimous voice vote.

II. Purpose of the Bill

The bill amends the Federal Aviation Act of 1958, as amended, to (1) enhance the Federal Government's access to university research capabilities and products by granting the FAA the authority to award single and multiyear research grants to colleges, universities, and non-profit organizations, (2) authorize the establishment of centers of excellence for research into aviation related areas of unique interest to the FAA which are not adequately sponsored by the aviation industry, and (3) create a pool of technical professionals trained in aviation related research areas of unique interest to the FAA and the aviation community.

III. Background and Need for Legislation

Several federal government agencies have as a basic charter the development of new technologies, concepts, and processes that are not amenable to private sector sponsorship due to their high risk and/or high cost. Some of those agencies include the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), and the Department of Defense (DOD).

In the past the FAA was perceived not to need an independent research capability because of its operational mission. However, the sophistication of the aviation industry, as well as the importance of that industry to the national economy, has reached a level where the FAA can keep pace only through continued efforts at enhancing the operational efficiency of the National Airspace System (NAS). This includes enhancements in airport capacity, air traffic control, aircraft safety, and airport security. Because of the specialized nature of the FAA functions, enhancements are often not available through the commercial marketplace or other government agencies and the FAA must sponsor research into NAS system enhancements itself.

The FAA is now heavily engaged in aviation research associated with aging aircraft, human factors, air traffic control automation, expert system applications, explosives detection systems, airport capacity enhancements, and other research areas vital to the safe and efficient functioning of the aviation system. Most of that work is being conducted through competitive contracts with private companies having an expertise in a technical area that can be adapted to meet FAA needs. The procurement process associated with those contracts is lengthy and requires a well defined statement of the work to be done. The contract also establishes a list of deliverables as well as a time schedule for milestone and product completion. This rigid contracting approach is not well suited to the less structured academic environment nor does it allow the FAA to capture the two most unique qualities of academic research: flexibility and innovation.

The FAA is aware of the value of academic research and has developed a method for accessing that resource: going through another government agency that has the legislated authority to award research grants. In this method, the FAA transfers money to that agency through an inter-agency agreement and establishes a formal joint program whereby both agencies provide technical guidance, with the other agency also providing the administrative

and procedural support. The FAA has a limited number of these agreements with NASA and NSF as well as with the Transportation System Center, a component of the Research and Special Projects Administration within the Department of Transportation. Such arrangements, while achieving the research ends desired by the FAA, add the considerable management and overhead costs associated with a multiple agency program.

The legislation reported by the Committee is needed to provide the FAA with a more efficient and cost-effective method by which it can access the resources and research facilities available at academic and non-profit institutions. It will enable the FAA to establish a research grant program for sponsoring activities ranging from low-level, exploratory experiments to establishing Centers of Excellence for long-term research in specific research areas.

The legislation is also needed to increase the pool of young people having experience in aviation and aviation technology development from which FAA and other segments of the aviation community can draw for managing and conducting future projects that will help ensure continued American preeminence in world civil aviation. By expanding the role academic institutions play in FAA aviation research, the legislation will encourage more institutions throughout the country to establish aviation research programs and enhance the long-term health of the aviation industry.

IV. Summary of the Hearing

There were two hearings conducted by the Subcommittee on Transportation, Aviation, and Materials during which FAA witnesses testified that the lack of a legislated authority to award research grants was an inhibitor to the progress of FAA research.

The first hearing was held on February 9, 1989 on the subject of Airport Security. During that hearing, then-Administrator T. Allen McArtor was asked if the FAA could use more funds for researching explosives detection technologies. He responded that "* * * the amount of dollars is one issue; the inability to employ those dollars * * * through grant programs, which we are not allowed to * * * give, * * * is just as restrictive to us as the total number of dollars available to us."

The FAA witness at the hearing on Oversight of the FAA Research, Engineering, and Development Budget, held on April 11-12, was Mr. Joseph Del Balzo; Executive Director for System Development. The Chairman asked the witness to explain the rationale behind the FAA's position on grant authority. Mr. Del Balzo explained that "An agency can make grants only with the expressed legislative authority to do so. The only legislative authority that we have to enter into grants are under the Airport Improvement Program and under the Airway Science Program. Everything else that we do with universities, we do competitively and we look at a university no differently than we look at any other institution and any other corporation. * * *"

Mr. Del Balzo also stated that "there are many times, particularly in the areas of long-term research, where I believe that it would be to our advantage if that capability (to award research grants) did exists. * * *"

The Chairman asked the witness to expand on the process by which the FAA currently accesses the academic research community. Mr. Del Balzo stated that the FAA is doing it through joint programs with NASA. If there are universities having a particular expertise, the FAA "* * * will submit our requirements and fund our requirements to those universities through NASA where the legislative authority exists." He also stated that "If we did not have that (NASA) vehicle, we would be required to develop a work statement, develop a set of requirements, advertise those requirements as we would any other competitive procurement, and universities would be free to compete with other universities or with any industry that would care to enter into the competition."

The Chairman then asked the witness if "* * * it would be a more useful expenditure of public funds if you could do as NASA does and deal directly * * * with universities?" Mr. Del Balzo responded that "* * * anything we can do to streamline the procurement process and expedite or accelerate an acquisition process has to be to our advantage."

V. Explanation of the Bill and Committee Views

Aviation has evolved into a sophisticated, high technology, competitive, international industry. The Committee feels strongly that the FAA has an operational mission critical to the American economy and way of life and that in order to perform that mission there are areas of legitimate research required that can only be adequately sponsored by the FAA, including air traffic control automation, aviation training, human performance, aircraft noise abatement, aging aircraft, structural integrity and artificial intelligence. The FAA must be able to harness the thinking of every individual, corporation, and institution capable of supporting that mission. The Committee feels that for the FAA not to have the authority to award research grants to academic institutions; as indicated in testimony by FAA witnesses at two Subcommittee hearings, is an unacceptable situation. Therefore, The Aviation Research Grant Act of 1989 (H.R. 2581) focuses on correcting the above problem by authorizing the FAA to establish a program for awarding research grants to colleges, universities, and non-profit organizations.

The FAA's current methods of accessing academic research capabilities are to (1) transfer funds to agencies having authority to award research grants and enter into a joint program through an inter-agency agreement, or (2) conduct a standard industry competitive procurement. The standard contract approach with its inherent rigidity and emphasis on specific milestones and time schedules, is not well suited to a unviversity research environment and is frustrating for both the university and the FAA. The mulitiple agency, joint program approach introduces formality, bureacracy, and program. Neither approach is cost-effective for the Federal government or the research institution.

At the same time, several colleges and universities have aviation programs, facilities, and personnel already engaged in aviation research projects which are or could be of interest to the FAA. Conversely, there are special areas of aviation research appropriate for academic research that are not being adquately explored at col-

leges and universities because of the limited communications with FAA. As a result of the current relationship FAA has with the academic community, there is a limited pool of people trained in aviation research from which the FAA and other segments of the aviation community can draw to conduct and manage aviation related projects.

The Committee, through H.R. 2581, intends to provide the FAA with the authority to establish a broad program to award research grants to colleges, universities, and non-profit organizations. The research grants may be single year awards to perform a specific research activity, multiyear awards to perform a major research project, or any combination of the above.

The bill also includes authorization for the establishment of centers of excellence for continued research in specific aviation areas of interest to the FAA. The Committee feels that the three Centers of Excellence for Rotary Wing Technology established by the United States Army Research Office at the University of Maryland, the Georgia Institute of Technology, and the Rensselaer Polytechnic Institute could serve as examples of the long-term research programs authorized under this bill.

H.R. 2581 provides a listing of research areas that the Committee feels is a sample of the types of research areas to be conducted through academic and non-profit institutions. The Committee wants to emphasize (1) that the list is not all inclusive and (2) that aviation research is not restricted to the development of technology.

Human Factors, for example, covers a broad spectrum of research that examines the human element in the aviation system. It includes the human factors for transiting to higher levels of automation, the human factors associated with a highly automated environment, as well as the human impact (e.g. self image, role confusion, etc.) the technology has upon the operators. This area of research is critical to the safety of the highly automated aviation systems of the future.

Another example of non-technology research is the development of new aviation and air traffic control training techniques and approaches that can expedite and enhance the quality and quantity of operational training received by FAA field personnel. The Committee is concerned about the capability of the current training processes to simultaneously train and maintain the proficiency of the current workforce plus prepare that same workforce for the introduction of the advanced automation systems and their new capabilities.

The Committee expects the FAA to design the research grant program in a manner that best serves the interests of the FAA and the aviation community. However, the Committee does feel that general guidance is required to ensure that (1) only worthwhile proposals are funded, and (2) that there is a reasonable opportunity for all colleges, universities, and non-profit organizations to compete for the research grant funds. Therefore, the bill stipulates that FAA establish a solicitation, review, and evaluation process that ensures (1) funding of proposals having adequate merit and relevancy to the FAA mission, (2) an equitable geographic distribu-

tion, and (3) the inclusion of historically black colleges and universities and other minority institutions for funding consideration.

The Committee expects the FAA to consider research merit and institutional capabilities as the primary criteria; with proposals lacking merit and/or institutional capabilities being rejected. Of the proposals deemed acceptable, the Committee would expect the FAA to assure reasonable geographic distribution of grant monies in determining the grant recipient. If the monies required to fund the accepted proposals are less than that reserved for grant awards, the Committee expects the FAA to return the remaining funds to the general Research, Engineering, and Development (RE&D) budget.

The Committee does not expect the FAA to set aside a specific amount of grant funds for historically black colleges and universities and other minority institutions. The concern is only that those institutions not be inadvertently disqualified due to arbitrary eligibility criteria. For example, the FAA solicitation for research grant proposals should not require that the institution offer a doctoral degree in a particular subject area unless that degree program is relevant and necessary for the research being sought.

H.R. 2581 amends the Airport and Airway Improvement Act of 1982, as amended, to require the FAA Administrator to make not less than 1% of the RE&D funding available to the FAA in a fiscal year, available for a research grant program. It is the intent of the Committee that this value be a minimum funding level (except when there is an insufficient number of acceptable research proposals) and that the funds available for research grants may exceed 1% at the discretion of the FAA Administrator.

VI. Sectional Analysis of the Bill

Section 1 establishes the short title: Aviation Research Grant Act of 1989.

Section 2 finds that the current methods by which the FAA gains access to the talents and capabilities of academic and non-profit research institutions is cumbersome, milestone oriented, inflexible, and not cost-effective for either the federal government or the research institution. The central cause of the inefficiency is that the FAA lacks the legislative authority to award research grants directly to those institutions. While many colleges and universities have research personnel and facilities actively engaged in projects of interest to the FAA, there are still many aviation related research areas appropriate for academic institutions not being adequately explored by those institutions. As a result, the pool of people trained in aviation related research from which the FAA and other segments of the aviation community can draw is limited.

Section 2 also defines the purposes of the bill as (1) enhancing the federal government's access to academic and non-profit organization research products by authorizing the FAA to grant single and multiyear research grants, (2) authorizing the FAA to establish centers of excellence for aviation related research not adequately sponsored by the aviation industry, and (3) creating a pool of technical professional trained in aviation related research of interest to the FAA and the aviation community.

Section 3 establishes the grant authority for the FAA to conduct aviation research and to establish centers of excellence for continuing research into areas deemed by the Administrator to be required for the long-term growth of civil aviation. It also provides a sample listing of the types of technological and non-technological research areas likely to be pursued through the grant program.

Section 3 also provides guidance for the grant selection process by stipulating that the FAA must establish a solicitation, review, and evaluation process that ensures (1) funding of proposals having adequate merit and relevancy to the FAA mission, (2) an equitable geographical distribution of grant funds, and (3) the inclusion of historically black colleges and universities and other minority institutions for funding consideration. In addition, Section 3 establishes the grant program requirements for application, record keeping, and reports to Congress.

Finally, Section 3 amends the Airport and Airway Improvement Act of 1982 to require the FAA Administrator to make not less than 1% of the RE&D funding made available to the FAA in a given fiscal year, available to the aviation research grant program.

VII. Inflation Impact

In accordance with Rule XI, Clause 2(l)(4), of the Rules of the House of Representatives, this legislation is assessed to have no adverse inflationary effect on prices and costs in the operation of the national economy.

VIII. Committee Oversight Findings and Recommendations

Pursuant to Rule XI, Clause 2(l)(3), of the Rules of the House of Representatives, and under the authority of Rule X, Clause 2(b)(1) and Clause 3(f), the following statement on oversight activities is made:

> The Committee's oversight findings are incorporated in the recommendations contained in the present bill and report.

IX. Summary of Government Operations Committee Findings and Recommendations

No findings and recommendations on oversight activity pursuant to Rule X, Clause 2(b)(2), and Rule XI, Clause 2(l)(3), of the Rules of the House of Representatives, have been submitted by the Committee on Government Operations for inclusion in this report.

X. Budget Analysis

The bill provides neither new budget authority nor new or increased tax expenditures and consequently the provisions of section 308(a) of the Congressional Budget Act are not applicable.

XI. Congressional Budget Office Cost Estimate

U.S. Congress,
Congressional Budget Office,
Washington, DC, October 20, 1989.

Hon. Robert A. Roe,
Chairman, Committee on Science, Space, and Technology, House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has reviewed H.R. 2581, the Aviation Research Grant Act of 1989, as ordered reported by the House Committee on Science, Space, and Technlogy, October 19, 1989. We estimate that no cost to the federal government or to state or local governments would result from enactment of this bill.

H.R. 2581 would authorize the Administrator of the Federal Aviation Administration (FAA) to make grants to colleges, universities, and non-profit research organizations to conduct aviation research and to establish centers of excellence for continuing research into areas required for the long-term growth of civil aviation. Under the bill, not less than one percent of the funds made available for a fiscal year for the research, engineering and development program funded by the Airport and Airway Trust Fund would be available to the Administrator for making such grants. (That program was appropriated $160 million for fiscal year 1989.)

H.R. 2581 would make it easier for the FAA to provide research grants to academic institutions, because in order to do so now, the agency has to transfer funds to other agencies that have such authority. No additional funding for research grants is authorized by the bill.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Mitchell Rosenfeld, who can be reached at 226-2860.

Sincerely,

Robert D. Reischauer,
Director.

XII. Changes in Existing Law (Ramseyer)

In compliance with clause 3 of Rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, H.R. 2581, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

Federal Aviation Act of 1958

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TITLE III—ORGANIZATION OF AGENCY AND POWERS AND DUTIES OF ADMINISTRATOR

* * * * * * *

DEVELOPMENT PLANNING

GENERAL

SEC. 312. (a) * * *

* * * * * * *

(g) RESEARCH GRANT PROGRAM.—

(1) GENERAL AUTHORITY.—The Administrator may make grants to colleges, universities, and nonprofit research organizations (A) to conduct aviation research, and (B) to establish centers of excellence for continuing research into areas deemed by the Administrator to be required for the long-term growth of civil aviation. Such research may include, but is not restricted to, research in the following areas among others: air traffic control automation, aviation applications of artificial intelligence, aviation and air traffic control training technologies and techniques, human factors (including those in highly automated environments), airspace and airport planning and design, airport capacity enhancement techniques, and aviation safety.

(2) APPLICATIONS.—A university, college, or nonprofit organization interested in receiving a grant under this subsection may submit to the Administrator an application for such grant. Such application shall be in such form and contain such information as the Administrator may require.

(3) SELECTION.—The Administrator shall establish a solicitation, review, and evaluation process that ensures (A) the funding under this subsection of proposals having adequate merit and relevancy to the mission of the Federal Aviation Administration, (B) an equitable geographical distribution of grant funds under this subsection, and (C) the inclusion of historically black colleges and universities and other minority institutions for funding consideration under this subsection.

(4) RECORDS.—Each person awarded a grant under this subsection shall maintain such records as the Administrator may require as being necessary to facilitate an effective audit and evaluation of the use of grant funds.

(5) REPORTS.—The Administrator shall make an annual report to the Committee on Science, Space, and Technology of

the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on the research grant program conducted under this subsection.

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SECTION 506 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982

SEC. 506. AIRWAY IMPROVEMENT PROGRAM.

(a) * * *

(b) RESEARCH, ENGINEERING AND DEVELOPMENT, AND DEMONSTRATIONS—

(1) DEMONSTRATION PROJECTS.—The Secretary is authorized to carry out under section 312 of the Federal Aviation Act of 1958 (49 U.S.C. App. 1353) such demonstration projects as the Secretary determines necessary in connection with research and development activities under such section.

(2) GENERAL AUTHORIZATION.—For research, engineering and development, and demonstration projects and activities under section 312 of the Federal Aviation Act of 1958 and paragraph (1) of this subsection, there is authorized to be appropriated from the Trust Fund—

(A) * * *

* * * * * * *

As used in this paragraph, the term "long-term research project" means a research project which is identified as a discrete project in the aviation research plan required by section 312(d)(1) of the Federal Aviation Act of 1958 and which is unlikely to result in a final rulemaking action within 5 years, or in initial installation of operational equipment within 10 years, after the date of the commencement of such project. *Not less than 1 percent of the funds made available under this paragraph for a fiscal year shall be available to the Administrator for making grants under section 312(g) of the Federal Aviation Act of 1958.*

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XIII. RECITAL OF RECORD VOTE ON REPORTING-COMMITTEE RECOMMENDATIONS

A quorum being present, the Committee ordered the bill favorably reported with amendments, by unanimous voice vote.

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